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COTTON
IN THAILAND

Foreword

This study is another in the Foreign Agricultural Service's continuing program of reporting on competitive agricultural developments in other countries. A trip by the author to Thailand in late 1964 provided much of the information in this publication, and the author thanks the many persons in Thailand who so generously helped to make this study possible.

The Thai economy is stable and prosperous and the country's nearly 30 million people are sharing to an increasing extent in the prosperity. The Government of Thailand is continuing the implementation of programs that are aimed at the development of an infrastructure of communications, transportation, irrigation, and hydroelectric schemes for the purpose of improving agricultural and industrial output. This study takes a close look at the Thai textile industry—the current situation and the outlook over the next few years.

To supply Thailand's growing textile industry, the country must import increasing amounts of raw cotton, of which the United States has furnished more than three-fourths in recent years. The Thai Government is encouraging domestic cotton production, which is being extended into newly cleared or drained land; research is also providing varieties better suited to the country's climatic conditions. Nevertheless, it seems likely that a cotton import trade will be sustained for some years, as consumption continues to rise more rapidly than production of raw cotton.

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COTTON IN THAILAND

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Summary and outlook

Until after World War II, Thailand produced all the cotton needed by its textile industry situated in small factories and homes. However, in the past several years, cotton consumption has outstripped domestic production, and Thailand has become a good market for significant quantities of U.S. cotton. Many—but not all—Thai officials would like to see domestic production increased to the point where imports of raw cotton could be eliminated. However, this does not seem likely. Thai per capita consumption of cotton is relatively low, but an increase is expected in view of the rising level of living and a larger population.

By 1964-65, the textile capacity had reached about 116,000 spindles and 3,400 looms in 12 mills. It is expected that by sometime in 1966 the number of spindles will have more than doubled over the 1964-65 figure and the number of looms will have been increased to about 5,000. Cotton will be used on most of this equipment but manmade fiber use will also be increased. In 1964-65, cotton consumption was estimated at about 120,000 bales, of which an estimated 10,000 to 15,000 bales were consumed in nonmill uses.

There will be need for a substantially larger quantity of raw cotton in the Thai textile industry in the next few years. To meet these requirements, increased domestic cotton production has been encouraged by Thai Government officials through increased research facilities and more comprehensive extension programs. Results are now being felt. The 1964-65 crop was estimated at 65,000 bales, compared with less than 30,000 a year in the early 1950's. A considerable portion of the crop is now grown under relatively primitive methods, although advanced techniques are gradually being adopted by the farmers. Improved varieties better suited to Thai conditions are being readied for distribution; and the use of insecticides and other improved practices, including use of mechanical power and equipment, is becoming more widespread. Also, extension services are being enlarged, as are also transportation and communications facilities.

Although climatic conditions in subtropical countries such as Thailand are not well suited for growing cotton, Thai producers appear prepared to meet the hazards, especially from insects and diseases, and production will probably expand considerably over the next several years. It also appears likely that consumption will increase at least as much. Under these conditions, Thailand will need to import at least as much cotton in each of the next several years as has been needed in the past 2 or 3 years. U.S. cotton has been the dominant foreign growth in the Thai market, and it should continue to compete strongly for this market when the price is competitive.

Table 1.—COTTON: Supply and distribution in Thailand, 1955-64[1]

Season[2]	Stocks Aug. 1	Production	Imports	Total supply	Consumption	Stocks July 31
	1,000 bales[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]
1955	5	35	5	45	39	6
1956	6	45	2	53	40	13
1957	13	50	1	64	50	14
1958	14	48	3	65	50	15
1959	15	45	17	77	65	12
1960	12	65	28	105	85	20
1961	20	58	42	120	95	25
1962	25	61	42	128	[4]102	26
1963	26	61	44	131	100	31
1964[5]	31	65	60	156	120	36

[1] Partly estimated. [2] Beginning August 1. [3] 480 pounds net. [4] Includes exports of 2,000 bales. [5] Preliminary.

Source: Official and trade statistics of Thailand and other information.

The textile industy

Cotton consumption

Two decades ago, Thailand's farmers produced all the cotton needed by the small textile industry, as well as a small quantity exported each year. Home spinners and weavers supplied most of the low-count yarns and fabrics needed by the country's population, while the higher-quality fabrics were imported.

Annual average consumption during the 1950-54 period was about 35,000 bales. A large part of this total—probably about 25,000 bales—was consumed in home industries, which used only domestic cotton. On the other hand, small quantities of imported fiber were mixed with local cotton in the textile mills.

During the next several years, Thailand's cotton production and cotton consumption both increased moderately. However, consumption moved ahead somewhat faster than production, and imports of cotton subsequently increased. During the 1955-59 period, consumption averaged about 50,000 bales a year. Consumption of cotton through home industries declined as output from textile mills became more readily available.

In recent years, cotton consumption has gained added momentum. In the 1964-65 season, it was estimated at 120,000 bales (including 10,000 to 15,000 bales of nonmill use). Domestic production has also continued to increase, but at a slower pace, so that larger imports of raw cotton have become necessary.

Reliable data on per capita consumption of cotton are not available, but it is certain that the use of cotton has increased considerably in recent years from relatively low levels. Cotton reportedly accounts for more than four-fifths of the fiber used in Thailand. However, rayon use has increased, though slowly, in recent years. The noncellulosic fibers have only recently appeared.

Mill facilities

In 1964, there were 12 mills in operation in Thailand, all in Bangkok or nearby. Most mills were fairly new, though used equipment had been installed in some. About 116,000 spindles and 3,400 looms were in operation in 1964. One mill, with nearly 10,000 spindles and 200 looms, used rayon, while the other mills used only cotton.

More than half the mills had both spinning and weaving facilities. In the nine spinning mills, the average number of spindles was 12,900 and the range from 10,000 to 21,000 spindles. In the 10 weaving plants, there was an average of about 335 looms. The number of looms in individual plants ranged from 200 to over 500.

Thai mills spin yarn of below 40's count. Around half of the domestic yarn output is about 20's count; this is used in the manufacture of the coarse fabric worn by most of the population. Most mills produce a fairly wide range of fabrics. For the lower-count yarn, a blend of foreign and domestic cotton is used. Less domestic cotton is used in the blend for higher-count yarn.

The textile industry has received considerable protection through tariffs on imports of those types of textiles produced locally. In 1962, the ad valorem import charge was raised from 22 percent to 32 percent on cotton textiles below 40's count. For the most part, this action has effectively reserved for the domestic industry the manufacture of those counts. All finercount yarns and fabrics are imported, and there is no import charge on these qualities.

If present plans by the mills materialize, the spinning capacity in Thailand will be increased to 244,000 spindles by sometime in 1966. By the same date, the number of looms is expected to reach 5,000. Cotton is expected to be the dominant fiber used on the additional equipment, but a portion of the new capacity will be devoted to manmade fiber. A new plant will be erected in Pitsanuloke, in central Thailand, as part of the textile facilities owned by the Thai Government.

Foreign trade in cotton and textiles

Imports of cotton

Shortly after World War II, Thailand began importing small quantities of raw cotton to supplement the domestic crop and also to enable the textile mills to spin somewhat higher-count yarns. Imports were small during the first decade after the war. Pakistan, India, and Burma were the principal sources of supply for the few thousand bales of foreign cotton that were then purchased by the industry.

In the late 1950's, imports began to rise sharply under pressure from the rapidly expanding textile industry in Thailand. The United States has gained a dominant position in this cash market. Imports of U.S. cotton reached a high of 36,000 bales in 1963-64; the figure was even larger in 1964-65. Most of this cotton purchased from the United States has been about one inch in staple length.

Table 2.—COTTON: Imports into Thailand, by country of origin, 1958-63[1]

Source	1958	1959	1960	1961	1962	1963
	1,000 bales[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]
United States	1	15	23	33	28	36
Mexico	0	0	0	1	8	3
Brazil	0	0	0	1	3	2
Pakistan	0	0	0	(3)	3	1
Other	2	2	5	6	(3)	2
Total	3	17	28	41	42	44

[1] Seasons beginning August 1. [2] 480 pounds net weight. [3] Less than 500 bales.

Source: *Monthly Reports of the Imports and Exports of Thailand*, Government of Thailand.

Imports of textiles

Thailand relies upon foreign sources for cotton textiles of 40's count and higher, and for manmade fiber yarn and most manmade fiber piece goods. Total imports of cotton piece goods have held between 135 million square yards and 179 million in recent years. Of the quantity imported, Japan usually supplies about two-thirds. Taiwan's shipments to Thailand have jumped sharply in recent years, although the figure for that country is relatively small. The USSR, the United States, and Hong Kong are the major sources of the remaining imports of cotton piece goods. In most recent years, total imports of cotton yarn have been about 10 million pounds. In 1963 Japan, Taiwan, and Hong Kong were the principal suppliers, but Pakistan has been important in some periods.

Table 3.—COTTON TEXTILES: Imports into Thailand by type and country of origin, 1958-63, Jan.-July 1964

Type and Country	1958	1959	1960	1961	1962	1963	Jan.-July 1964
Piece goods:	*Mil. sq. yds.*	*Mil. sq. yds.*	*Mil. sq. yds.*	*Mil. sq. yds.*	*Mil. sq. yds.*	*Mil. sq. yds.*	*Mil. sq. yds.*
Japan	93.6	120.2	106.7	108.2	111.1	86.7	47.8
Taiwan	0	.4	4.4	19.9	16.5	18.0	9.3
USSR	1.4	5.3	6.0	10.2	9.1	13.3	9.4
United States	12.7	11.7	10.4	12.0	9.9	10.2	2.9
Czechoslovakia	1.2	3.5	2.8	1.0	1.6	1.3	.5
India	4.8	10.1	3.4	3.7	1.6	1.1	.1
Hong Kong	30.5	14.2	9.3	10.6	3.1	.8	.9
Poland	0	.4	4.9	5.9	1.6	.6	.3
Rumania	0	0	.2	1.3	.9	.2	0
Other	4.9	8.2	10.5	6.6	1.9	4.3	1.2
Total piece goods	149.1	174.0	158.6	179.4	157.3	136.5	72.4

Table 3.—COTTON TEXTILES: Imports into Thailand by type and country of origin, 1958-63, Jan.-July 1964—Cont.

Type and country	1958	1959	1960	1961	1962	1963	Jan.-July 1964
Yarn:	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*
Japan	2.8	3.2	3.0	3.9	5.1	3.8	1.5
Taiwan	(1)	(1)	.4	.6	1.3	3.2	2.7
Hong Kong	6.2	10.1	6.0	4.3	2.4	3.0	.2
United Kingdom	.3	.2	.2	.2	.2	.2	.1
Pakistan	0	1.1	.4	(1)	.2	.1	1.2
France	.1	.1	(1)	(1)	.1	(1)	(1)
Other	.8	.5	.3	.6	0	.4	2.9
Total yarn	10.2	15.2	10.3	9.6	9.3	10.7	8.6

(1) Less than 50,000 pounds.
Source: *Foreign Trade of Thailand,* Government of Thailand.

Imports of manmade fiber textiles have increased in the past several years. Rayon continues to be the major type imported, but the noncellulosics have begun to appear in larger quantities. Imports of manmade fiber piece goods amounted to 48 million square yards in 1963, compared with 31 million yards only 5 years earlier. Japan supplied nearly all this item, although small quantities were obtained from the United States and Taiwan. Total imports of manmade fiber yarn rose to 4.5 million pounds in 1963, from 1.8 million 5 years earlier. Taiwan accounted for nearly all the increase and that country is now the largest supplier of this type of yarn to Thailand.

Table 4.—MANMADE FIBER TEXTILES: Imports into Thailand by type and country of origin, 1958-63, Jan.-July 1964

Type and country	1958	1959	1960	1961	1962	1963	Jan.-July 1964
Piece goods:	*Mil. sq. yd.*	*Mil. sq. yd.*	*Mil. sq. yd.*	*Mil. sq. yd.*	*Mil. sq. yd.*	*Mil. sq. yd.*	*Mil. sq. yd.*
Japan	22.0	25.7	19.8	20.3	35.2	47.1	28.1
United States	5.2	6.5	4.4	2.4	1.3	2.8	.6
Taiwan	(1)	0	(1)	(1)	.2	.4	.1
Germany, West	1.1	.2	.1	.2	.2	.2	.1
Hong Kong	1.7	1.5	.7	.6	.1	.2	.2
United Kingdom	.2	.1	.1	(1)	.1	.3	(1)
Italy	(1)	.2	.3	.2	.1	.6	(1)
Other	.9	1.2	.5	.7	.1	.7	1.6
Total	31.1	35.4	25.9	24.4	37.3	52.3	30.7
Yarn:	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*	*Mil. lb.*
Taiwan	0	0.2	0.2	0.9	2.1	2.6	1.9
Japan	1.3	1.2	.9	1.6	1.0	1.6	1.2
France	(2)	.1	.1	.3	.2	.2	.1
Other	.5	.7	.3	.2	.1	.1	.1
Total	1.8	2.2	1.5	3.0	3.4	4.5	3.3

(1) Less than 50,000 sq. yd. (2) Less than 50,000 pounds.
Source: *Foreign Trade in Thailand,* Government of Thailand.

The raw cotton industry

Acreage and production

Cotton is a relatively minor crop in Thailand, although Asiatic varieties have been cultivated for more than 1,000 years. Only about one-fifth of Thailand's territory of 198,000 square miles is under cultivation and of this area more than three-fourths is devoted to rice. Forest reserves cover much of the area not under cultivation. Despite the relatively small acreage being tilled, about 75 percent of Thailand's population is directly dependent upon agriculture, including forestry.

Experiment station at Sri-sam-rong (lower left) is part of Thai program to expand cotton output, which is still far short of consumption. Import arrivals from the United States (illustrated lower right) are therefore expected to continue strong.

Although cotton is planted on only a small part of the cultivated area, the crop has received much interest from officials of the Thai Government and from other interested groups. This interest has been particularly evident in recent years. Larger quantities of cotton have been required in the domestic textile industry, and many officials of the Thai Government look to increased domestic cotton production as the best method to reduce the drain on foreign exchange.

Table 5.—COTTON: Area, lint yields, and production in Thailand, 1955-64[1]

Season[2]	Area	Yields	Production	Season[2]	Area	Yields	Production
	1,000 acres[3]	*Lb. per acre*	*1,000 bales*[4]		*1,000 acres*[3]	*Lb. per acre*	*1,000 bales*[4]
1955	81	207	35	1960	104	300	65
1956	98	220	45	1961	132	211	58
1957	101	238	50	1962	136	215	61
1958	101	228	48	1963	140	209	61
1959	119	182	45	1964[5]	160	195	65

[1] Partly estimated. [2] Beginning August 1. [3] Estimated on the basis of net cotton. [4] 480 pounds net. [5] Preliminary.
Source: Official and trade statistics of Thailand and other information.

Although procedures for the compilation of agricultural statistics in Thailand are somewhat unreliable, it appears certain that the area devoted to cotton has nearly doubled since the early 1950's. In 1964-65, cotton area was estimated at about 150,000 acres. Cotton production has climbed also, and at a somewhat faster pace, in the past decade. Preliminary data for 1964-65 indicate a crop of about 65,000 bales, compared with less than 30,000 bales in the early 1950's. Probably not over 45,000 bales of the 1964 crop were suitable for mill use—the remainder was used for home spinning, padding, and other nonmill uses.

Although to date most of the production increases have come from larger acreage, in the future higher yields will be encouraged by use of better seed and a gradual improvement in farming practices. However, yields fluctuate widely from season to season. No Thai cotton land is irrigated. In fact, cotton in most areas is frequently subjected to excessive rainfall.

Although some cotton is grown in over half of Thailand's 71 provinces, nearly all that enters commercial channels is produced in two areas. The major area, where more than three-fourths of the country's cotton is grown, is centered around the city of Sawankaloke. A large part of the remaining crop is produced near Loey.

Cotton is grown in a wide range of soils, and under widely differing rainfall patterns. For the most part, however, cotton is produced on fairly heavy soils in areas of heavy rainfall. The water level in many areas is near the surface but waterlogging is seldom a problem, and an excessive quantity of salt in the soil is not yet in evidence. Most cotton in Thailand is planted in July and August during breaks in the rainy season.

Generally, cotton is grown on land that is not suitable for rice paddy, because the slope of the field makes it unsuitable for maintaining an even water level, or because sufficient water is not available. Where there is a choice, rice is grown. Otherwise, cotton must compete for the land with corn, sugarcane, tobacco, cassava, peanuts, soybeans, sesame, kenaf, and other crops. In recent years, the Government of Thailand has encouraged families in overcrowded areas to resettle in newly cleared forest land or newly drained land. The government is emphasizing diversified farming, and it is partly for this reason that cotton is among the crops planted on the new farms.

Production practices

Production methods vary widely among cotton growers in Thailand. In many areas, cotton is still produced under generations-old practices. Interplanting of cotton into a growing crop of soybeans, chillies, peanuts, corn, or mung beans is common. Frequently, the cotton must fend for itself after it is planted. The distance between rows ranges from well over 3 feet to 6 feet. Hills of plants in the rows may be more than 3 feet apart. Also, thinning is often done late or omitted, and the plants left in each hill are likely to be spindly.

In place of these more primitive cotton production practices, an increasing number of Thai farmers are highly receptive to more advanced farming methods. The number of tractors in Thailand has increased sharply in recent years. In some of the advanced cotton areas, a majority of the cotton producers make use of mechanized equipment for land breaking. (Much of this is done on a contract basis.) Holdings are small and on most farms cotton is planted on only a few acres. Frequently, farmers do custom work on neighboring farms in addition to the tractor work on their own holdings. Even on the more advanced farms, however, fertilizer is not generally used. Most cotton farmers own their own land.

Much of the expansion in cotton production in recent years has resulted from the use of newly-cleared land. New land has been cleared of brush and timber, and the cotton planted among the burned stumps. Often, after the field has been planted only two or three years in cotton, soil fertility has been depleted to the point where production has no longer been profitable. When the soil had become badly depleted, and when weeds and plant pests had become a serious problem, the farmer has shifted production to another new field. In addition to wasting land resources, this method of cotton culture has often caused the destruction of timber more valuable than the cotton produced. It is expected that this "slash and burn" method of cotton production will disappear when new land becomes more limited and when more advanced agricultural methods become common.

Disease and insects

Cotton in Thailand is subject to heavy damage from many insect pests and from several types of bacterial blight. Seedling blight, angular leaf spot, and boll-rot are the more serious blight forms present. For cotton varieties that lack resistance, the leaf-sucking jassid (*Empoasca devastans*) will virtually prohibit plant growth unless a complete spray program is followed. Other serious pests include aphids, spiny bollworms, pink bollworms, and common bollworms (corn earworms). There are a number of other insects that are serious pests in limited areas in some seasons. The more serious among these insect pests are stem weevils, leaf rollers, loopers, leaf worms, thrips, and red spider mites.

A problem that appears to be growing more serious as improved varieties are introduced is the plant disorder called leaf roll. The definite cause is not now known. The disorder appears even in plants fully protected with insecticides. Some varieties are considerably more resistant than others to leaf roll.

Evidence has indicated that diseases and insects can be fairly well controlled if seed is treated and a spray program of 5 to 8 applications followed. Nevertheless, the actual use of advanced techniques is frequently discouraged by the additional expense of such controls, or by the farmer's lack of information as to their effective application. Small portable spray tanks are the equipment generally used. At the present time, there is no official closed period. However, at the end of the 1962-63 season, Thai farmers were advised to destroy old cotton stalks, and clean up other places where cotton insects could survive until cotton was to be planted again. Reportedly, the clean-up was late but fairly good, and it is probable that the short closed period was helpful in reducing the pink bollworm population in the 1963-64 season. The spiny bollworm was less responsive, because this pest finds several attractive alternate hosts.

Varieties

The Thai Government has done considerable work at various research stations in an attempt to find varieties that are best suited to local conditions. This work has been well coordinated with research on insect and disease control, and with work on improved cultural practices. The research program was given a boost in 1962 from financial and technical aid under the Colombo Plan. Under the plan, a cotton breeder-agronomist from the Empire Cotton Growing Corporation and an entomologist from Fisons Pest Control Ltd. have been working with their Thai counterparts at the Srisamrong cotton experiment station near Sukhothai.

Since about 1930, the Thai Ministry of Agriculture has sought to replace the local Asiatic varieties with superior foreign cotton. First, seed brought from Cambodia produced a low-yielding plant with a staple length of about ⅞ inch. This performance was an improvement over the Asiatic cotton, but in yield and staple length the Cambodian cotton was still far behind advanced American Upland varieties. However, it had one significant advantage over most American Upland growths—it was highly resistant to jassid attack because of the length and density of its leaf hairs.

New cotton varieties that are now gaining in commercial acceptance were developed at the Srisamrong station from a cross between the Cambodian cotton and a high-yielding American Delta and Pine Land variety. One of the new varieties, SK 32, appears to offer the best possibility among the Cambodian test materials for a striking advance in yields under Thai conditions. However, SK 32 is subject to weak stalks under conditions favorable for heavy vegetative growth. Experiment station scientists believe that the tendency of this variety to lodge can be corrected by selection, but they feel that a faster solution can be found through introduction of a suitable foreign variety. In this respect, interest has centered upon Albar, which was introduced from Nigeria. The parent stock was Allen, an American Upland variety. It is expected that in commercial production, Albar will have a staple length of as much as 1-1/16 inches. Research is continuing with the object of combining the lint quality of the introduced varieties with the jassid resistance of SK 32.

A major drawback to the rapid improvement in quality of Thailand's cotton is the lack of high-quality planting seed of those strains already developed and in common use. At present, most planting seed is purchased from the gin. Frequently, Asiatic cottonseed becomes mixed with Upland seed, and the quality of the latter is thereby seriously lowered.

Seed of the newer varieties, on the other hand, is not yet widely available to farmers. However, the government is finding more cooperators for seed multiplication, and it is expected that high-quality seed from some improved varieties will be generally available within the next few seasons.

Harvesting and ginning

Most of the cotton produced in Thailand is harvested during December-February. The plants are generally hand-picked 4 or 5 times. Women and children comprise most of the labor supply.

Typical middleman of Thai cotton industry is this dealer millowner shown at lower left with author. His gin mill (right) supplies cotton fiber to Bangkok spinners.

Because of the lack of transportation, many farmers are forced to sell their seed cotton to dealers who go from farm to farm. However, to an increasing extent, the farmer now hauls his seed cotton to a local market where his harvest is sold to local buyers. If production credit is needed, the local buyer supplies it to cotton growers. Rates of interest are not generally specified separately, and the cost of the credit is hidden in the purchase price of the cotton. Some production credit is now being supplied through the Thai Ministry of Agriculture.

The buyer in the local market frequently works on a commission basis for a gin, and purchases seed cotton in small lots from the farmer. Little attention is given to quality of the product, with the result that the cotton often contains excessive trash and insect-damaged bolls. Although there is at present little incentive for the farmer to deliver clean, high-quality cotton to the market, there is a growing awareness in Thai Government circles of the need for emphasizing quality by establishing cotton grades and standards.

At present, ginning capacity is adequate for the quantity of cotton produced in Thailand. However, most gins are relatively old and inefficient. All are of the roller type. Most plants have no more than 10 or 12 single stands; however, several are larger, and some have fairly modern double stands. Most of the work in the gins is performed by women and children. Wages are equivalent to about 30 U.S. cents for a 10-hour day.

Ordinarily, all cotton brought to the gin is mixed with no regard for the different varieties or for the different quality of the lint. The resulting lint lacks uniformity and contains a great deal of foreign matter. Some gins report waste figures as high as 15 to 20 percent.

Thai cotton is pressed into a bale that weighs from 260 to 400 pounds gross. The bale is often covered with two burlap rice sacks and is bound with 4 or 5 metal straps. The bale covering weighs between 10 and 15 pounds. Samples are not cut from the bale at the gin.

Most of the extremely low-quality cotton is sold to the makers of cotton quilts. The small quantity of home-ginned cotton is also used for this purpose, in most instances. Except for the relatively small quantities of cotton consumed in home industries, domestically produced Thai cotton is hauled by truck or rail to the textile center in Bangkok. Ordinarily, the cotton is transported by the ginner to Bangkok and sold there directly to the mill.

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